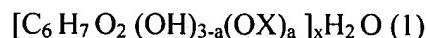


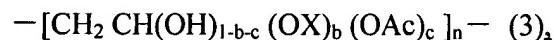
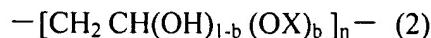
AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1. (Currently Amended): A non-viral gene delivery vector formed from an aqueous solution of [[A]] a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups, for a non-viral gene delivery vector, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)



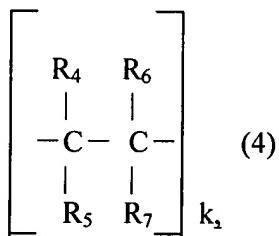
or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)



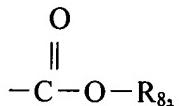
wherein Wherein X is a $-(CH_2)_m R_1$ organic radical where R_1 is a member of the class consisting of:

- $-NH_2$ radical,
- $-N(CH_3)_2$ radical,
- $-N(C_2H_5)_2$ radical,
- $-N^+(C_2H_5)_3$ radical,
- $-N^+(CH_2)_2CH_2CH(OH)CH_3$ radical,
- $-N^+(C_2H_5)_2CH_2CH(OH)CH_3$ radical,
- $-N^+(C_2H_5)_2(C_2H_5)N(C_2H_5)_2$ radical,
- $-C_6H_4NH_2$ radical, [[and]]
- $-COC_6H_4NH_2$ radical,

—COR₂ radical where R₂ is —CH₂NH₂ or —C₆H₄NH₂, and
—CH₂ CH(OH)CH₂R₃ radical [[,]] where R₃ is —NH₂, —N(CH₃)₂, —N(C₂H₅)₂,
[[and]] or —N⁺(C₂H₅)₃ radical,
where m is a natural number of 1 to 3, a is a positive number having a value of
0<a<3, b is a positive number having a value of 0<b<1, x and n are natural numbers having a
value of 5 or more, 1>b+c, and Ac is acetyl radical; and
a unit derived from a polymerize-able olefin compound of the following formula (4):



wherein Wherein R₄, R₅ and R₆ are each selected from the group consisting of
hydrogen and CH₃, and R₇ is a member of the group consisting of:



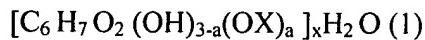
Where where R₈ is a member of the class consisting of: hydrogen, C₁—C₁₂ alkyl radicals,
cyclohexyl radical, C₁—C₄ hydroxyalkyl radicals, C₁—C₈ aminoalkyl radicals, C₁—C₈
dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C₁—C₄ lower alkyl
—substituted tetrahydrofuran radical, benzyl radical, [[the]] a (CH₂CH₂O)_y CH₂CH₂OH
radical where y is a positive integer from 1 to 10, and—N(R₉)₂, where the two [[R_{9,s}]] R₉'s
which may be the same or different, are either hydrogen or a C₁—C₄ alkyl radical;

$\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{CN}; -\text{OH}; -\text{C}-\text{R}_{10} \\ \text{wherein } \text{Wherein } \text{R}_{10} \text{ is a } \text{C}_1-\text{C}_8 \text{ alkyl radical, } [[;]] \text{ phenyl radical, } [[;]] \text{ tolyl radical, } [[;]] \text{ pyridine radical, } [[;]] \text{ pyrrolidone radical; and } \end{array}$

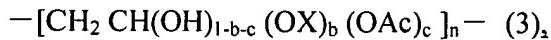
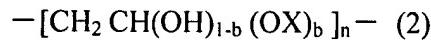
$\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{R}_{11_a} \end{array}$

Where where R_{11_a} is NH_2 , NHCH_3 , N,N-dimethylamino radical,
 $\text{N,N-dimethylaminopropylamino}$ radical, and morpholine radical.

2. (Currently Amended): A process for preparing a non-viral gene delivery vector formed from an aqueous solution of a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups, for a non-viral gene delivery vector, which comprises reacting a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)



wherein Wherein X is a $-(\text{CH}_2)_m\text{R}_1$ organic radical where R_1 is a member of the class consisting of:

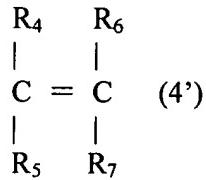
$-\text{NH}_2$ radical,

$-\text{N}(\text{CH}_3)_2$ radical,

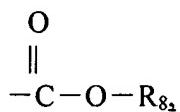
$-\text{N}(\text{C}_2\text{H}_5)_2$ radical,

–N⁺(C₂H₅)₃ radical,
–N⁺(CH₂)₂CH₂CH(OH)CH₃ radical,
–N⁺(C₂H₅)₂CH₂CH(OH)CH₃ radical,
–N⁺(C₂H₅)₂(C₂H₅)N(C₂H₅)₂ radical,
–C₆H₄NH₂ radical, [[and]]
–COC₆H₄NH₂ radical,
–COR₂ radical where R₂ is –CH₂NH₂ or –C₆H₄NH₂, and
–CH₂CH(OH)CH₂R₃ radical where R₃ is –NH₂, –N(CH₃)₂, –N(C₂H₅)₂, [[and]]
or –N⁺(C₂H₅)₃ radical,

wherein m is a natural number of 1 to 3, a is a positive number having a value of 0<a<3, b is a positive number having a value of 0<b<1, x and n are natural numbers having a value of 5 or more, 1>b+c, and Ac is acetyl radical; with a polymerize-able olefin compound of the formula (4'):



wherein Wherein R₄, R₅ and R₆ are each selected from the group consisting of hydrogen and CH₃, and R₇ is a member of the group consisting of:



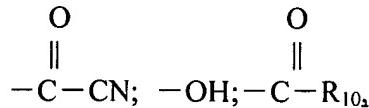
where Where R₈ is a member of the class consisting of hydrogen, C₁–C₁₂ alkyl radicals, cyclohexyl radical, C₁–C₄ hydroxyalkyl radicals, C₁–C₈ aminoalkyl radicals, C₁–C₈

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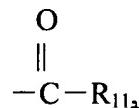
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dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C₁–C₄ lower alkyl –substituted tetrahydrofuran radical, benzyl radical, [[the]] a (CH₂CH₂ O)_y CH₂CH₂OH radical where y is a positive integer from 1 to 10, and –N(R₉)₂ where the two [[R_{9,s}]] R₉'s which may be the same or different, are either hydrogen or a C₁–C₄ alkyl radical;

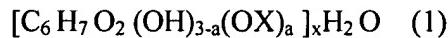


where Where R₁₀ is a C₁–C₈ alkyl radical, [[;]] phenyl radical, [[;]] tolyl radical, [[;]] pyridine radical, [[;]] pyrrolidone radical; and

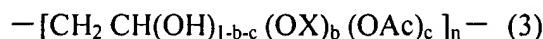
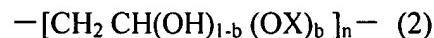


where Where R₁₁ is NH₂, NHCH₃, N,N-dimethylamino radical, N,N-dimethylaminopropylamino radical, and morpholine radical.

3. (Currently Amended): A complex between a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups and DNA, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)



wherein Wherein X is a $-(CH_2)_m R_1$ organic radical where R_1 is a member of the class consisting of:

$-NH_3^+$ radical,

$-NH^+ (CH_3)_2$ radical,

$-NH^+ (C_2H_5)_2$ radical,

$-N^+ (C_2H_5)_3$ radical,

$-N^+(CH_2)_2CH_2CH(OH)CH_3$ radical,

$-N^+(C_2H_5)_2CH_2CH(OH)CH_3$ radical,

$-N^+(C_2H_5)_2(C_2H_5)N (C_2H_5)_2$ radical,

$-C_6H_4NH_3^+$ radical, [[and]]

$-COC_6H_4NH_3^+$ radical,

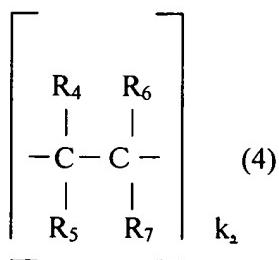
$-COR_2$ radical where R_2 is $-CH_2NH_3^+$ or $-C_6H_4NH_3^+$, and

$-CH_2 CH(OH)CH_2R_3$ radical where R_3 is $-NH_3^+$, $-NH^+ (CH_3)_2$, $-NH^+ (C_2H_5)_2$,

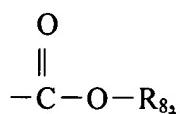
[[and]] or $-N^+ (C_2H_5)_3$ radical,

where m is a natural number of 1 to 3, a is a positive number having a value of $0 < a < 3$, b is a positive number having a value of $0 < b < 1$, x and n are natural numbers having a value of 5 or more, $1 > b + c$, and Ac is acetyl radical;

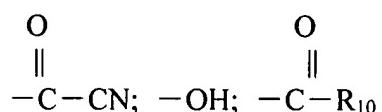
a unit derived from a polymerize-able olefin compound of the following formula (4)



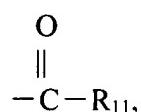
wherein Wherein R_4 , R_5 and R_6 are each selected from the group consisting of hydrogen and CH_3 and R_7 is a member of the group consisting of:



where Where R_8 is a member of the class consisting of hydrogen, C_1-C_{12} alkyl radicals, cyclohexyl radical, C_1-C_4 hydroxyalkyl radicals, C_1-C_8 aminoalkyl radicals, C_1-C_8 dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C_1-C_4 lower alkyl-substituted tetrahydrofuran radical, benzyl radical, [[the]] a $(CH_2CH_2O)_y CH_2CH_2OH$ radical where y is a positive integer from 1 to 10, and $-N(R_9)_2$ where the two [[R_9 ,s]] R_9 's which may be the same or different, are either hydrogen or a C_1-C_4 alkyl radical;

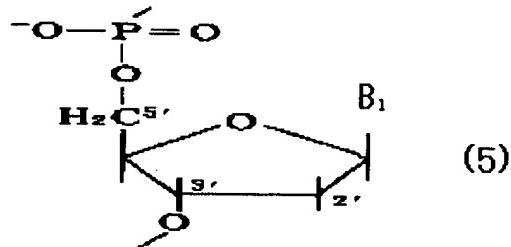


where Where R_{10} is a C_1-C_8 alkyl radical, [[;]] phenyl radical, [[;]] tolyl radical, [[;]] pyridine radical, [[;]] pyrrolidone radical; and



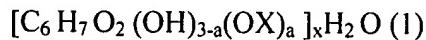
where Where R_{11} is NH_2 , $NHCH_3$, N,N -dimethylamino radical, N,N -dimethylaminopropylamino radical, and morpholine radical; and

a unit derived from a poly(deoxyribonucleotide) of the following formula (5) as a recurring unit[[.]] :

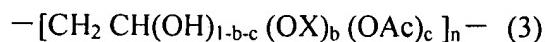
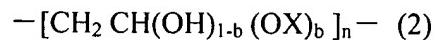


where Where B₁ is a base selected from the group of adenine, thymine, guanine, and cytosine.

4. (Currently Amended): A complex between a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups and RNA, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)



wherein Wherein X is a $-(CH_2)_m R_1$ organic radical where R₁ is a member of the class consisting of:

$-NH_3^+$ radical,

$-NH^+ (CH_3)_2$ radical,

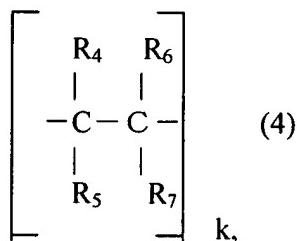
$-NH^+ (C_2H_5)_2$ radical,

$-N^+ (C_2H_5)_3$ radical,

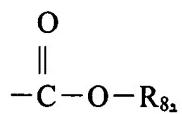
–N⁺(CH₂)₂CH₂CH(OH)CH₃ radical,
–N⁺(C₂H₅)₂CH₂CH(OH)CH₃ radical,
–N⁺(C₂H₅)₂(C₂H₅)N(C₂H₅)₂ radical,
–C₆H₄NH₃⁺ radical, [[and]]
–COC₆H₄NH₃⁺ radical,
–COR₂ radical where R₂ is –CH₂NH₃⁺ or –C₆H₄NH₃⁺, and
–CH₂CH(OH)CH₂R₃ radical where R₃ is –NH₃⁺, –NH⁺(CH₃)₂, –NH⁺(C₂H₅)₂,
[[and]] or –N⁺(C₂H₅)₃ radical,

where m is a natural number of 1 to 3, a is a positive number having a value of 0<a<3,
b is a positive number having a value of 0<b<1, x and n are natural numbers having a value
of 5 or more, 1>b+c, and Ac is acetyl radical;

a unit derived from a polymerize-able olefin compound of the following formula (4)

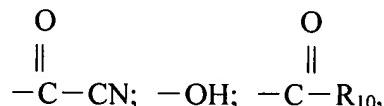


wherein Wherein R₄, R₅ and R₆ are each selected from the group consisting of hydrogen and
CH₃ and R₇ is a member of the group consisting of:

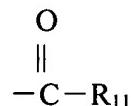


where Where R₈ is a member of the class consisting of hydrogen, C₁–C₁₂ alkyl radicals,
cyclohexyl radical, C₁–C₄ hydroxyalkyl radicals, C₁–C₈ aminoalkyl radicals, C₁–C₈

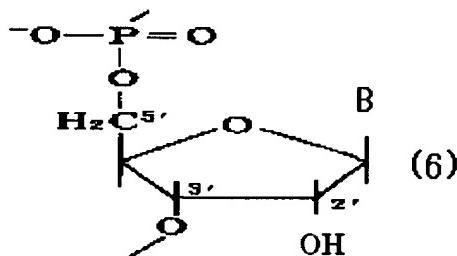
dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C₁-C₄ lower alkyl -substituted tetrahydrofuran radical, benzyl radical, [[the]] a (CH₂CH₂ O)_y CH₂CH₂OH radical where y is a positive integer from 1 to 10, and—N(R₉)₂ where the two [[R_{9,S}]] R₉'s which may be the same or different, are either hydrogen or a C₁—C₄ alkyl radical;



where Where R₁₀ is a C₁—C₈ alkyl radical, [[;]] phenyl radical, [[;]] tolyl radical, [[;]] pyridine radical, [[;]] pyrrolidone radical; and



where Where R₁₁ is NH₂, NHCH₃, N,N-dimethylamino radical, N,N-dimethylaminopropylamino radical, and morpholine radical; and a unit derived from a poly(ribonucleotide) of the following formula (6) as a recurring unit[[.]]:



where Where B is a base selected from the group of adenine, uracil, guanine, and cytosine.

5. (Currently Amended): A gene delivery system using [[a]] the complex between the cationic graft-copolymer and DNA [[,]] of Claim 3.

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6. (Currently Amended): A gene delivery system using [[a]] the complex between the cationic graft-copolymer and RNA [[,]] of Claim 4.